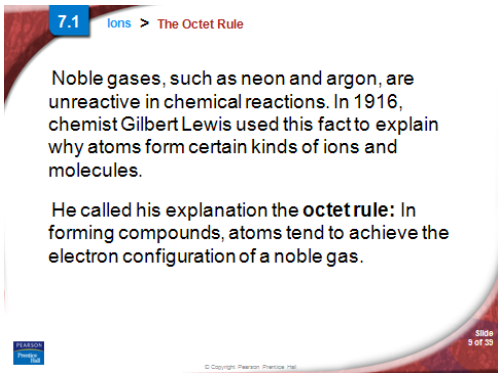
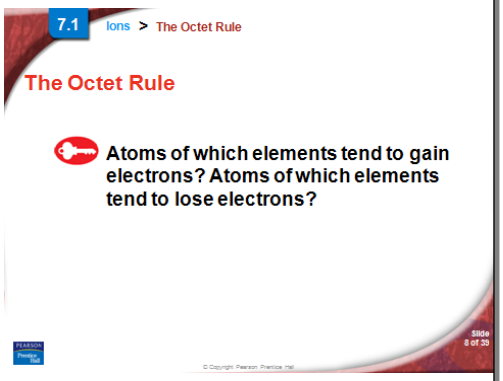
Lewis Electron Dot Diagrams-GN Lewis

A Lewis electron dot diagram or structure shows the valence electrons which are the electrons involved in bonding. A dot or symbol of some kind is used to represent the s and p orbital electrons around an atom.

Octet Rule-Atoms try to attain the electron arrangement that is most stable. The electron arrangement of a noble gas is normally eight electrons (helium is the exception).





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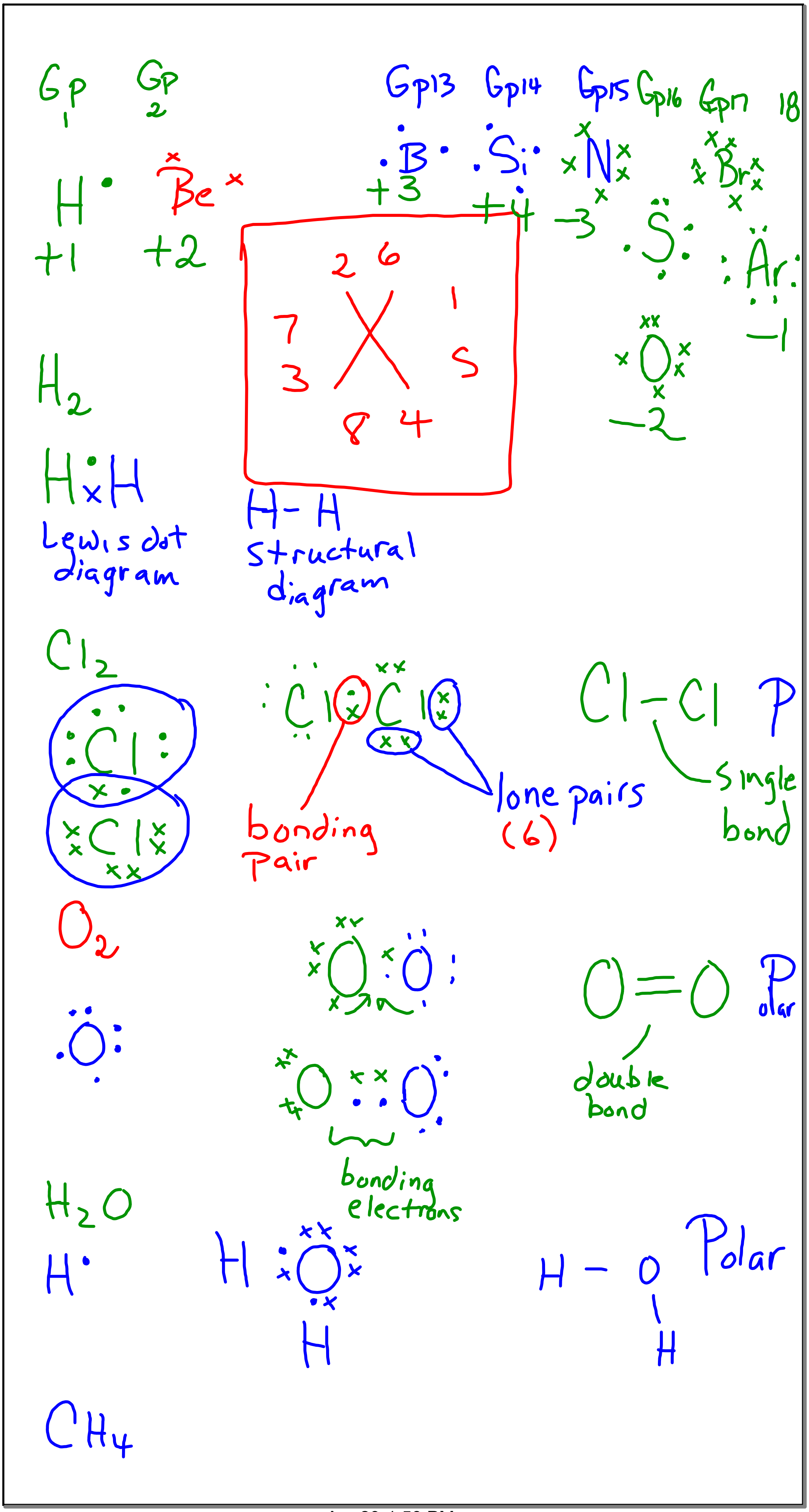
Gp 1
Gp 2
Gp13
Gp14
Gp15
Gp16
Gp17
18
H
+1
Be
+2
B
+3
Si
+4
N
-3
S
Br
Ar
O
-2
-1
2 6
7 X 1
3 5
8 4
H2
H:H
Lewis dot diagram
H-H
structural diagram
Cl2
Cl
Cl:Cl
Cl-Cl
bonding pair
lone pairs (6)
single bond
O2
O
O=O
Polar
double bond
bonding electrons
H2O
H
H-O
Polar
CH4

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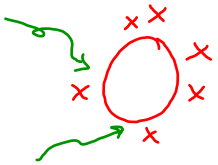
7.1 Ions > Valence Electrons

Valence Electrons

How do you find the number of valence electrons in an atom of a representative element?



6 valence electrons

16

Slide 3 of 39

O^{2-} ← two bonds (charge)

Stable octet
S $2e^-$
P $6e^-$

Single -O-
double O=
triple bonds

N^{3-} P^{3-}

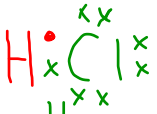
N≡ or -N= or N

P≡

Lewis electron Dot Structural Diagram

Polar / Non Polar

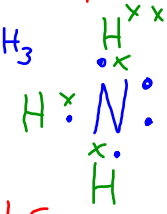
HCl

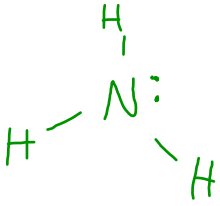


H-Cl

Polar

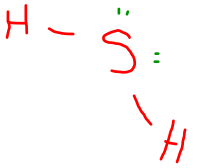
NH_3





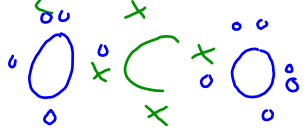
Polar

H_2S



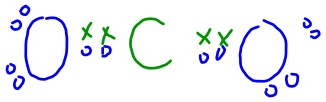
Polar

CO_2



Nonpolar

O=C=O



CH_3COOH

Chapter 12 Stoichiometry (Chemical Reaction Calculations)

Gravimetric Stoichiometry

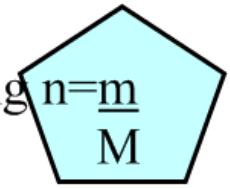
measurement quantity

steps used to measure something

Gravimetry stoichiometry is the steps used calculate the amounts of substances involved in a chemical reaction.

STEPS

1. Write a balanced equation and list the information under the equation.
2. Convert the given measurement to moles using $n=\frac{m}{M}$

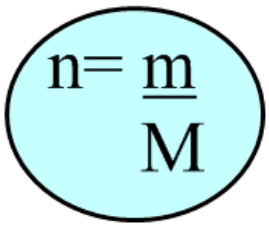


3. Use the mole ratio to calculate the amount of the unknown substance from the given measurement in moles.

$$\text{given moles} \times \frac{\text{unknown coefficient}}{\text{given coefficient}}$$

? / given

4. Convert the moles of the unknown to the required quantity using the mole formula.



Ex: How much oxygen is required to burn 10.2kg OF propane.

given unknown

1) $C_3H_8(g) + 5O_2(g) \rightarrow 3CO_2(g) + 4H_2O(g)$

$m = 10.2\,kg$ (10200 g) $m = ?$

$M = 44.11\,g/mol$ $M = 32.00\,g/mol$

37 Kg

2) $n = \frac{10200\,g}{44.11\,g/mol} = 231.24\,mol$

3) $231.24\,mol \times \frac{5\,mol\ ?}{1\,mol\ given} = 1156.2\,mol$

4) $n = \frac{m}{M}$

$m = 1156.2\,mol \times 32.00\,g/mol$

$m = 36998.4\,g$

$3.7 \times 10^4\,g$

37 Kg

Define with a sKetch or words.

p244 Titration:

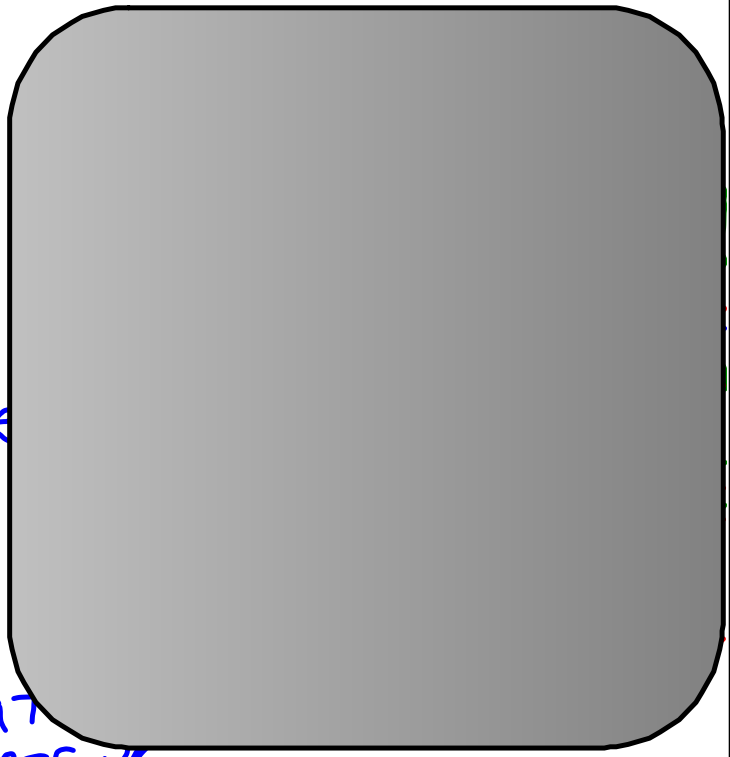
Titrant:

Endpoint:

Equivalence Point

Buret:

How accurat
should successive titrations be?



Acid Base titration overview

http://www.youtube.com/watch?v=8UiuE7Xx5l8

http://www.youtube.com/watch?feature=endscreen&v=BBIGR0RAMtY&NR=1

Apr 23-2:01 PM

1. [1] $2H_2O_2(\ell) \rightarrow 2H_2O(\ell) + O_2(g)$

$m = 68.0\,g$ given

$M = 34.02\,g/mol$

a) $m = ?$

$M = 18.02\,g/mol$

b) $m = ?$

$M = 32.00\,g/mol$

a) [2] $n = \frac{68.0\,g}{34.02\,g/mol} = 2.00\,mol$

[3] $2.00\,mol \times \frac{2\,mol\ ?}{2\,mol\ given} = 2.00\,mol$

[4] $n = \frac{m}{M}$

$2.00\,mol = \frac{m}{18.02\,g/mol}$

$36.04\,g = m$

b) [1] same

[2] same $2.00\,mol$

[3] $2.00\,mol \times \frac{1\,mol\ ?}{2\,mol\ given} = 1.00\,mol$

[4] $n = \frac{m}{M}$

$1.00\,mol = \frac{m}{32.00\,g/mol}$

$32.00\,g = m$

$H_2O_2 \rightarrow H_2O + O_2$

$68.0\,g \rightarrow 36.04\,g + 32.00\,g$

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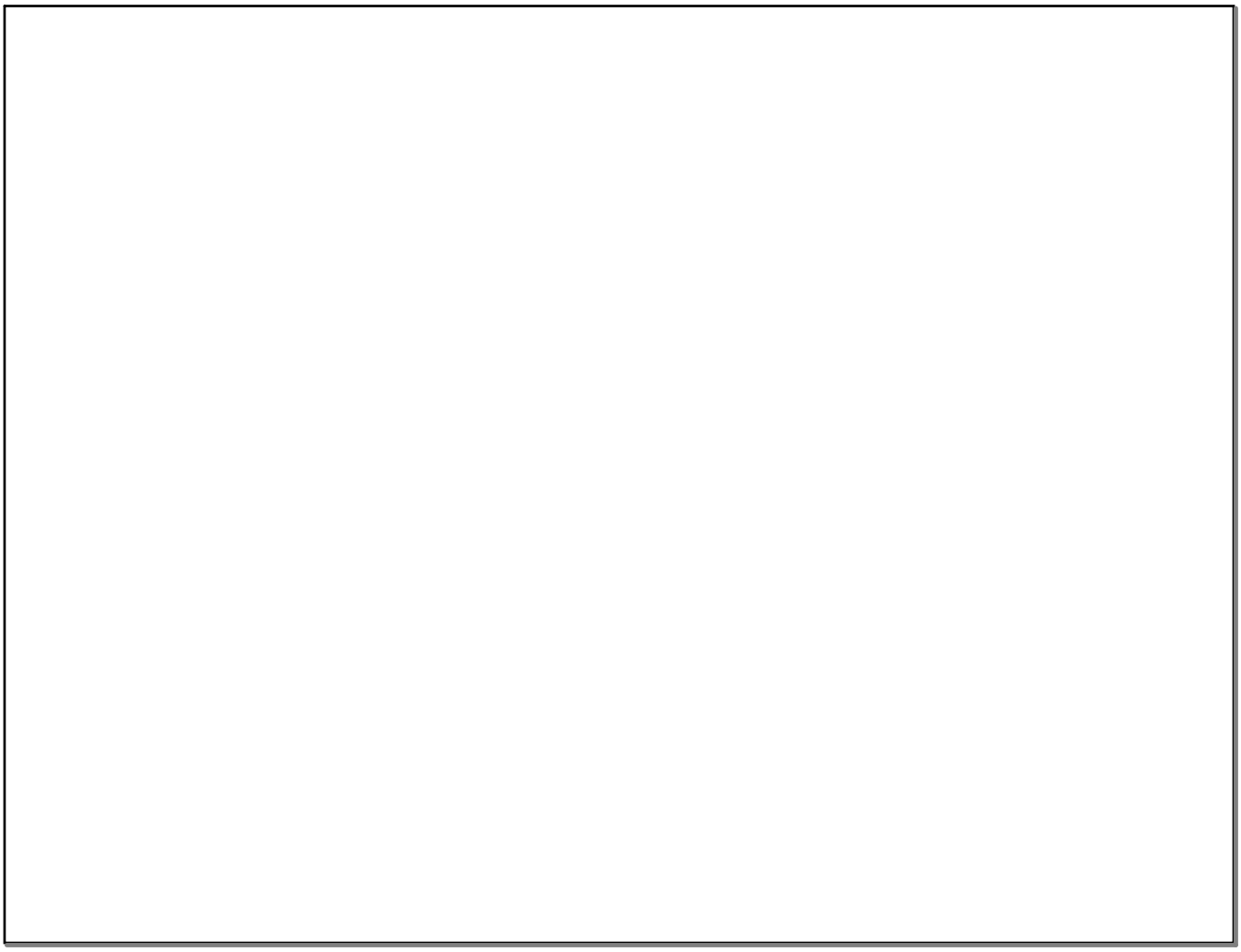

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